भारतीय मानक
Indian Standard

IS 2973 : 2017
(Amalgamating IS 12474 : 1988)
(Reaffirmed 2022)

बाइसिकल — स्टीयरिंग हैड एसेम्बली — विशिष्टि

(दूसरा पुनरीक्षण)

Bicycles — Steering Head Assembly — Specification

(Second Revision)

ICS 43.150

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भारतीय मानक ब्यूरो
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March 2017 **Price Group 7**

Bicycles Sectional Committee, TED 16

FOREWORD

This Indian Standard (Second Revision) was adopted by Bureau of Indian Standards, after the draft finalized by the Bicycles Sectional Committee had been approved by the Transport Engineering Division Council.

Bicycle steering head assemblies PH Type and R Type were earlier covered under two separate standards namely, IS 2973 : 1983 'Bicycle steering head assembly (PH type)' and IS 12474 : 1988 'Bicycle steering head assembly (R type)'. As a result of experience gained by manufacturers of bicycles, many other form of steering head assemblies have evolved over a passage of time.

This standard was first published in 1964 and was first revised in 1983. This revision of standard is being taken up to amalgamate IS 12474 and to include other type of steering head assemblies being used in bicycle industry, since most of the requirements of all types of steering head assemblies are similar.

In the preparation of this standard considerable assistance has been derived from JIS 9401 : 1997 'Frame-Assembly for bicycles' issued by the Japanese Industrial Standard.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BICYCLES — STEERING HEAD ASSEMBLY — SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers the dimensions and other requirements for bicycle steering head assembly of ‘R’ type, ‘PH’ type, ‘Cage’ type and ‘Threadless’ type.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of the standards. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No.	*Title*
513 : 2008	Cold-rolled low carbon steel sheets and strips (*fifth revision*)
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (*third revision*)
1079 : 2009	Hot rolled carbon steel sheets and strips — Specification (*sixth revision*)
1572 : 1986	Specification for electroplated coating of cadmium on iron and steel (*second revision*)
1573 : 1986	Specification for electroplated coating of zinc on iron and steel (*second revision*)
2062 : 2011	Hot Rolled Medium and High Tensile Structural steels — Specification (*seventh revision*)
2500 (Part 1) : 2000	Sampling inspection procedures : Part 1 Attributes samplingplans indexed by acceptable quality level (AQL) for lot by lot inspection (*third revision*)
2898 : 1976	Steel balls for rolling bearings (*first revision*)
4258 : 2011	Metallic materials — Conversion of hardness values (second revision)
10613 : 2014	Cycles — Safety requirements for bicycles (*second revision*)
15184 : 2002	Bicycles — Steel balls — Specification

3 MATERIALS

3.1 Frame Cup

Frame cups, when they have ball track to accommodate the steel balls (that is form a composite unit with ball races) (R type) shall be made of steel conforming to IS 1079. Frame cups when they does not have ball track to accommodate steel balls (that is does not form a composite unit with ball races) and accommodate ball races which provide the ball track for steel balls (PH type), they shall be made of steel conforming to IS 513 or IS 1079.

Top and bottom cups when they have ball track to accommodate the steel balls (that is form a composite unit with ball races) (R type) shall be suitably heat treated to have a minimum hardness of 600 HV (with 5 kgf load) or 400 VPN (100 g load).

3.2 Ball Race

Ball race provided shall be made of steel conforming to IS 1079 and shall be suitably heat treated to give minimum hardness of 600 HV (with 5 kgf load) or 400 VPN (100 g load).

3.3 Crown Race and Screwed Race

Crown race and screwed race shall be made of steel conforming to IS 1079 and shall be suitably heat-treated to contain a minimum hardness of 600 HV (with 5 kgf load) (*see* IS 4258) or 400 VPN (with 100 g load).

3.4 Balls

Balls shall conform to grade 200 of IS 2898 or IS 15184.

3.5 Lamp Bracket and Locking Nut

Lamp bracket and locking nut shall be made of steel conforming to IS 513 or IS 1079.

NOTE — In addition to the minimum properties specified, the materials shall have other metallurgical properties which would make them suitable for fabrication of the particular component in accordance with good manufacturing practice.

4 NOMENCLATURE

4.1 The nomenclature for various components of the steering head assembly shall be as described in Fig. 1, Fig. 2, Fig. 3 and Fig. 4.

4.2 The screw threads on the race shall be as described in Fig 5.

5 DIMENSIONS

5.1 Dimensions for Steering Head Assembly 'PH' Type

5.1.1 *Frame Cups*

The dimensions of the top and bottom frame cups, when they do not form composite unit with their ball races, shall be as described in Fig. 6 and Fig. 7.

5.1.2 *Inner Ball Races*

The dimensions of the top and bottom inner ball races, when they do not form composite units with their respective race seating shall be as described in Fig. 8.

5.1.3 *Crown Race and Screwed Race*

The dimensions of the crown race and screwed race shall be as described in Fig. 9 and 10. The screw threads on the race shall be as described in Fig. 5.

5.2 Dimensions for Steering Head Assembly 'R' Type

5.2.1 The dimensions of the frame cups shall be as described in Fig. 11 and Fig. 12.

5.2.2 The dimensions of the crown races and screwed races shall be as described in Fig. 13 and Fig. 14.

5.2.3 The screw threads on the race shall be as described in Fig. 5

5.3 Dimensions for Steering Head Assembly 'Cage' Type

5.3.1 The dimensions of the frame cups shall be as described in Fig. 15.

5.3.2 The dimensions of the crown races and screwed races shall be as described in Fig. 16 and Fig. 17.

5.4 Locking Nut

Two types of locking nuts are popularly used that is hexagonal shape and octagonal shape. The dimensions of the locking nuts shall be as described in Fig. 18A and Fig. 18B.

5.5 Lamp Bracket and Basket Mounting Bracket

The dimensions of the lamp bracket and basket mounting bracket shall be as described in Fig. 19A

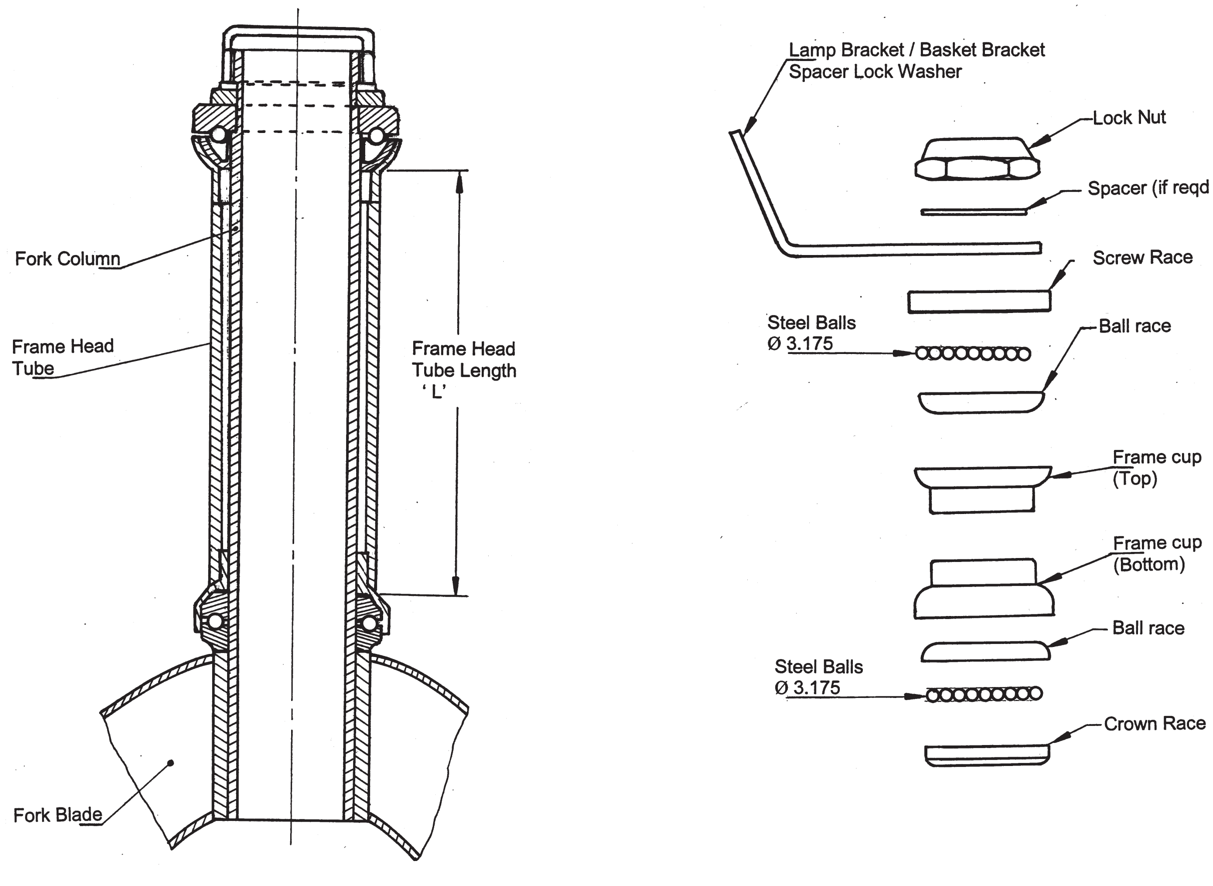


Fig. 1 PH Type Head Fittings

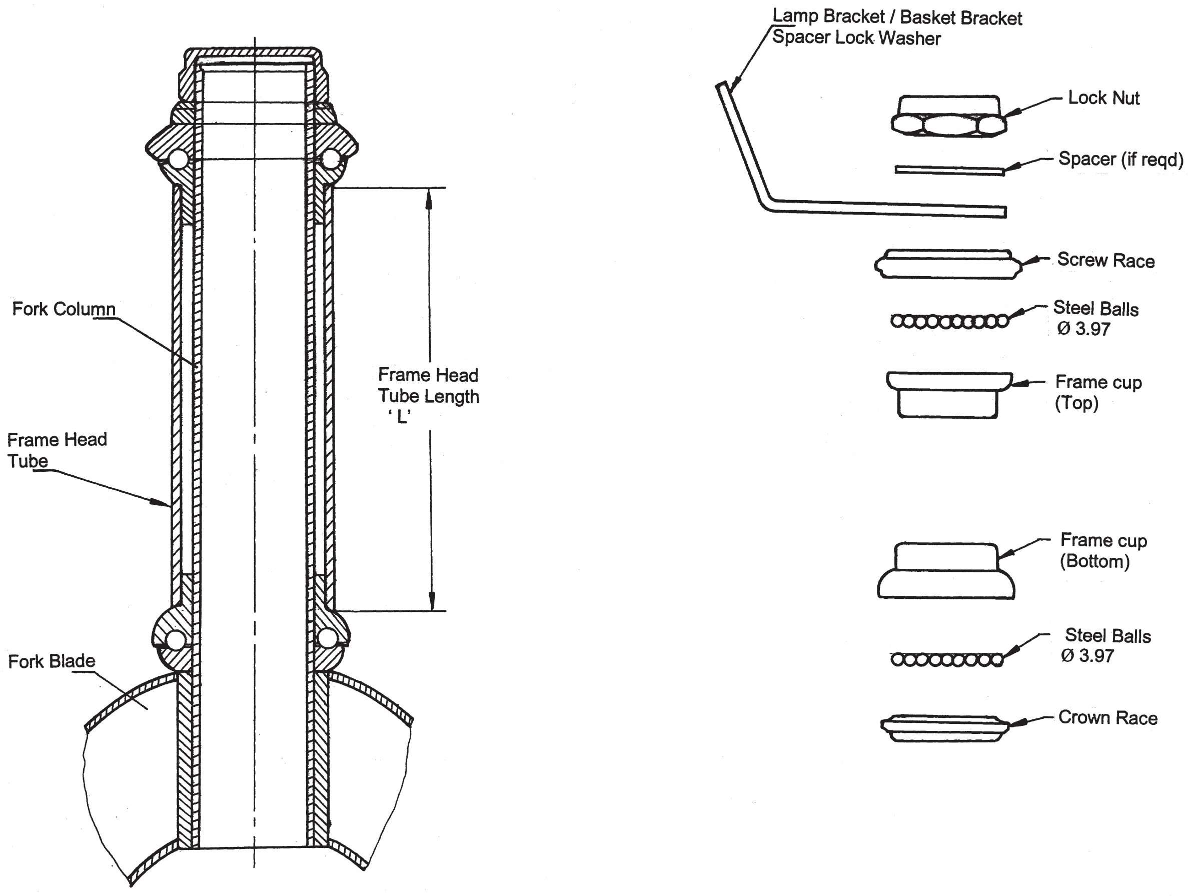


FIG. 2 R TYPE HEAD FITTINGS

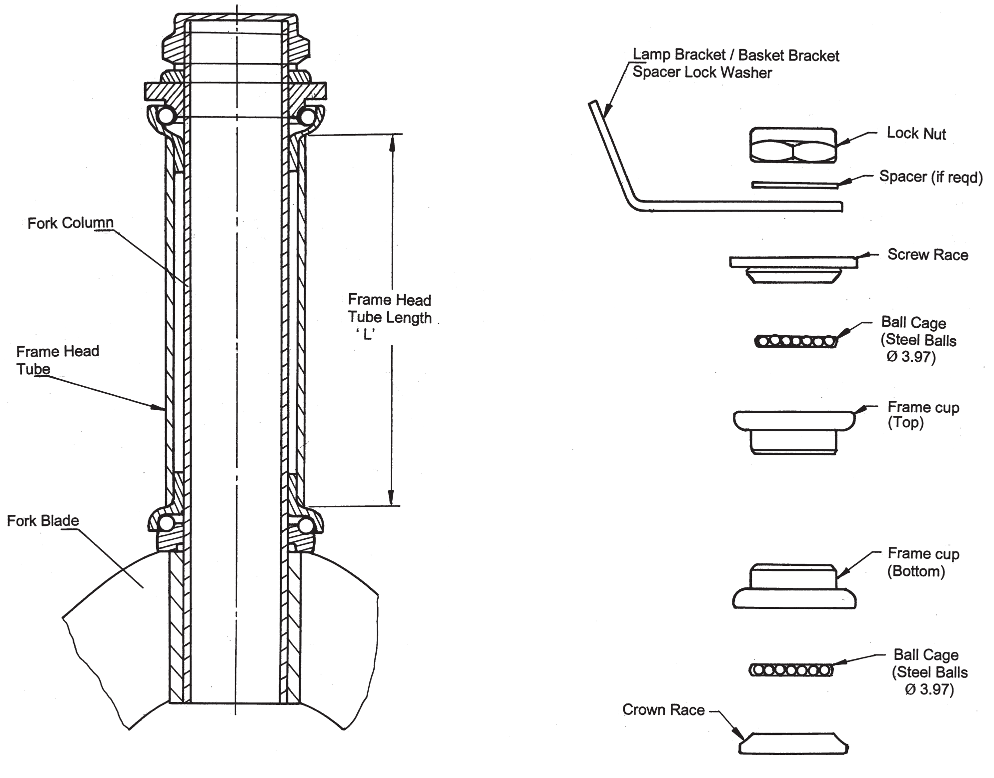


FIG. 3 CAGE TYPE HEAD FITTINGS

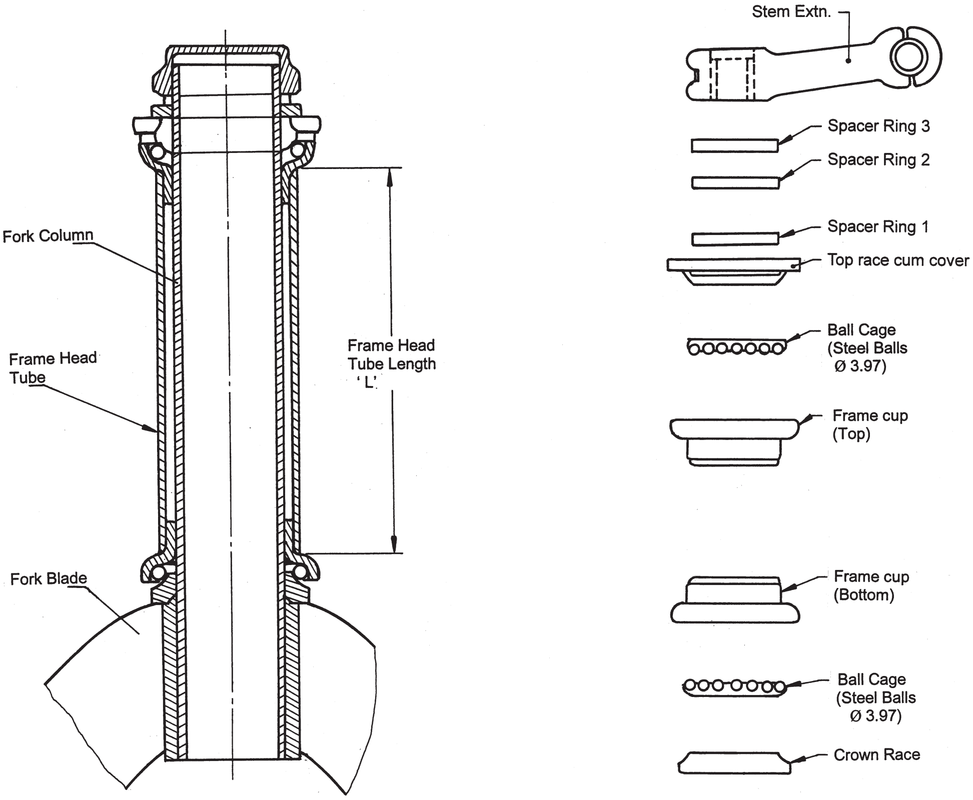
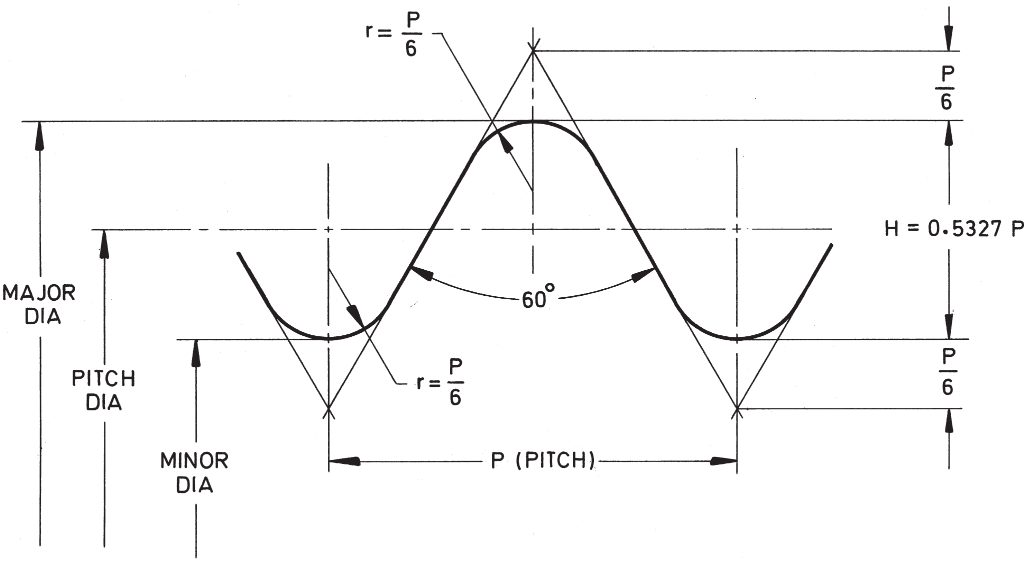


FIG. 4 THREAD LESS TYPE HEAD FITTINGS



Size	*Pitch*	*Internal Thread*		
		Major Dia	Effective Dia	Minor Dia
25.4 × 1.06	1.06	25.4	24.836 $^{+0.117}_{-0.000}$	24.272 $^{+0.338}_{-0.000}$

All dimensions in millimetres.

FIG. 5 FORM OF THREAD

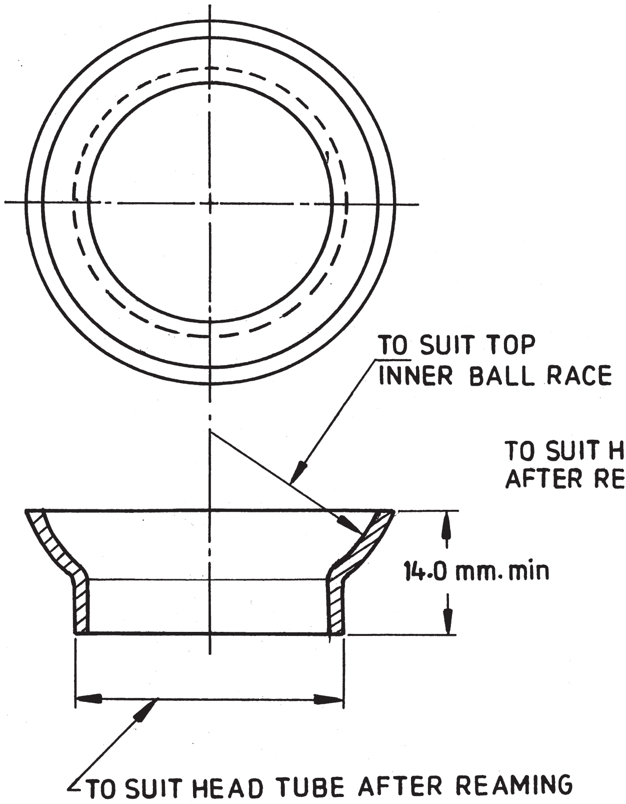


FIG. 6 TOP FRAME CUP

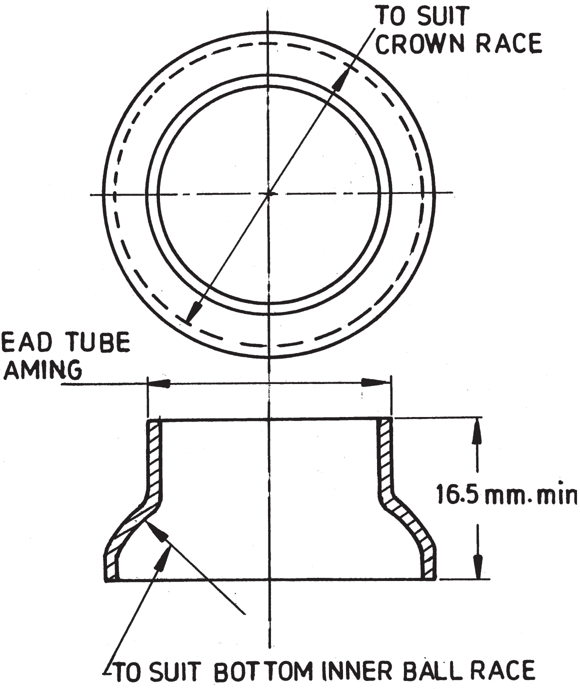
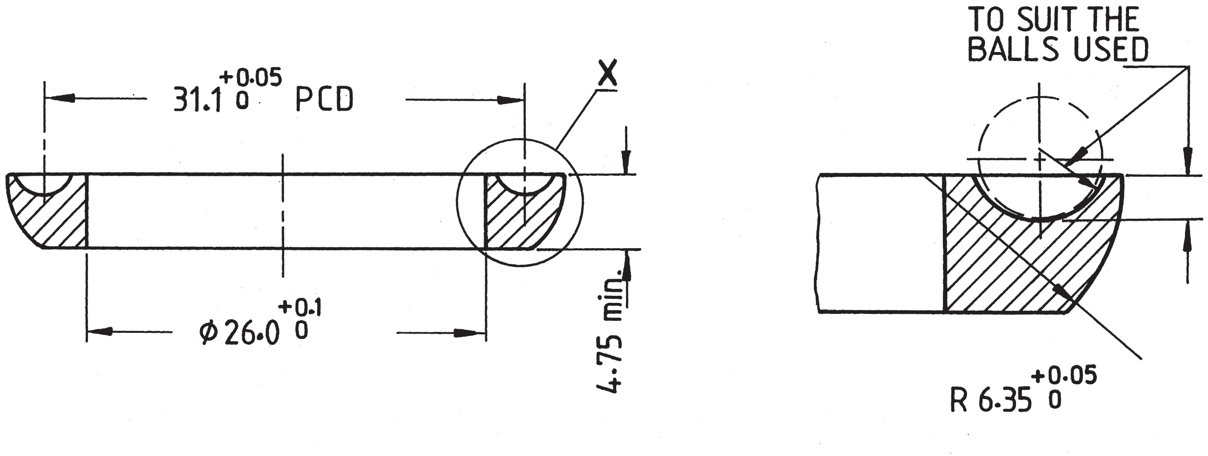

TO SUIT CROWN RACE
TO SUIT HEAD TUBE AFTER REAMING
16.5 mm. min
TO SUIT BOTTOM INNER BALL RACE

FIG. 7 BOTTOM FRAME CUP

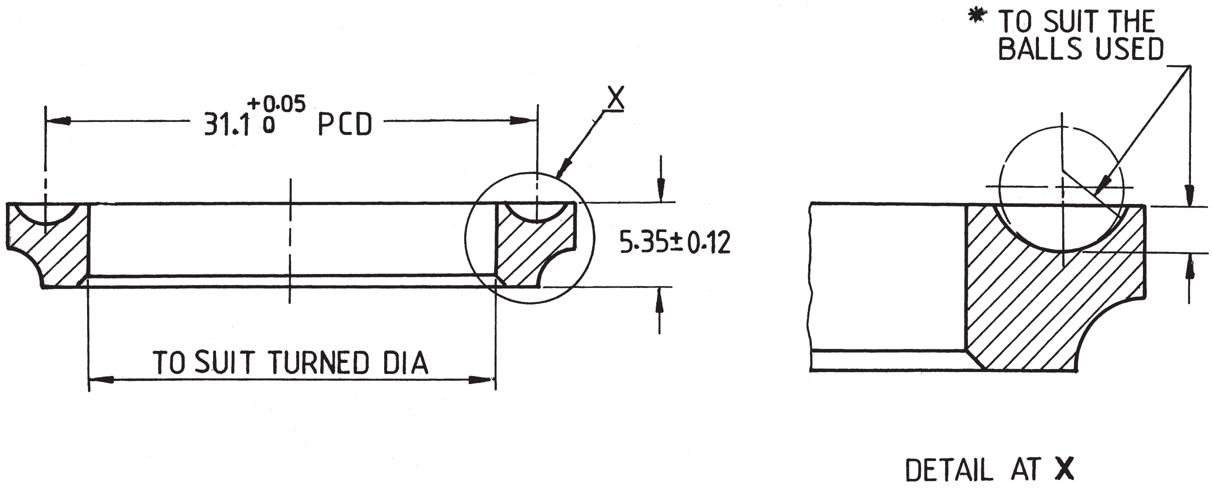


DETAIL AT X

*Seating shape for balls may be hemispherical or V-grooved.

All dimensions in millimetres.

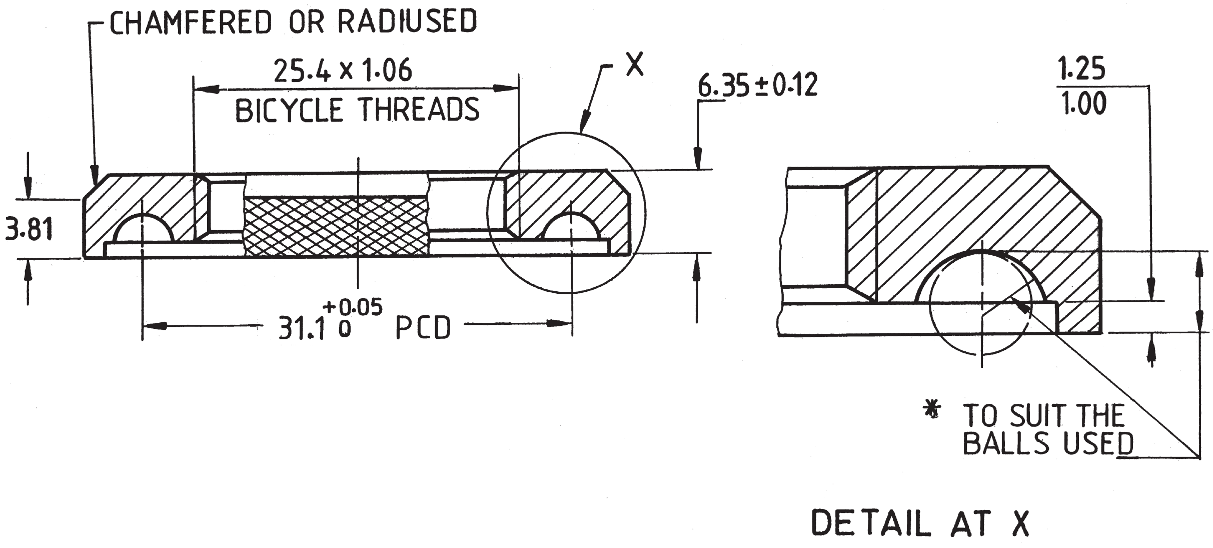
FIG. 8 INNER BALL RACE



*Seating shape for balls may be hemispherical or V-grooved.

All dimensions in millimetres.

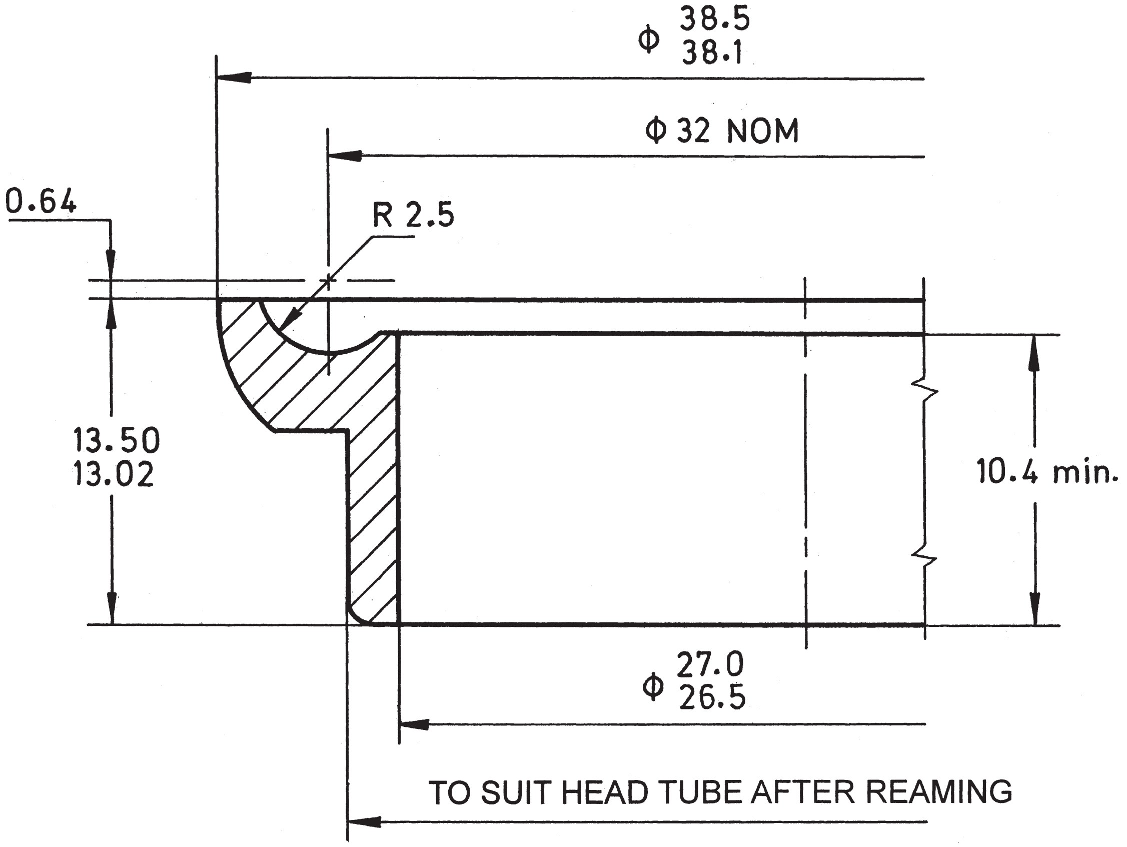
FIG. 9 CROWN RACE



*Seating shape for balls may be hemispherical or V-grooved.

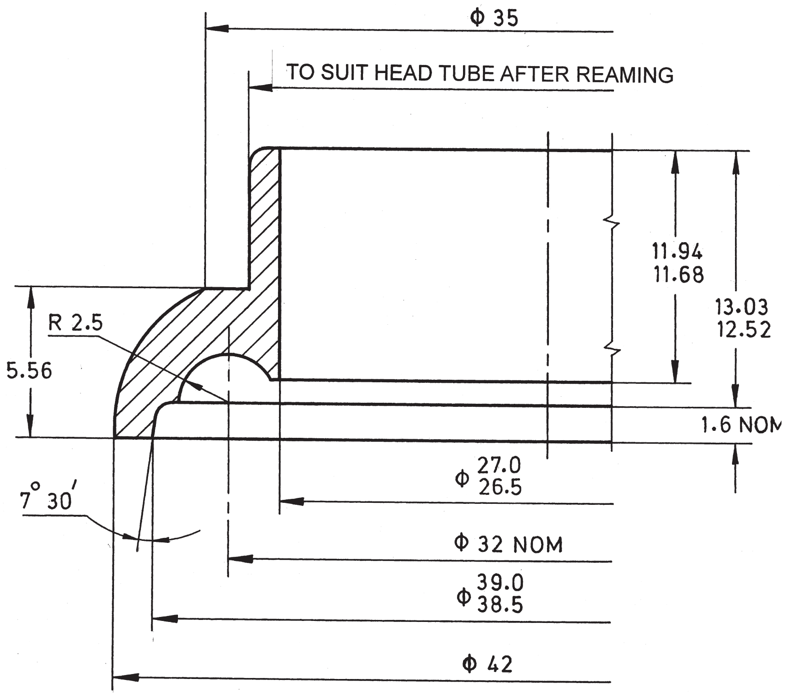
All dimensions in millimetres.

FIG. 10 SCREWED RACE



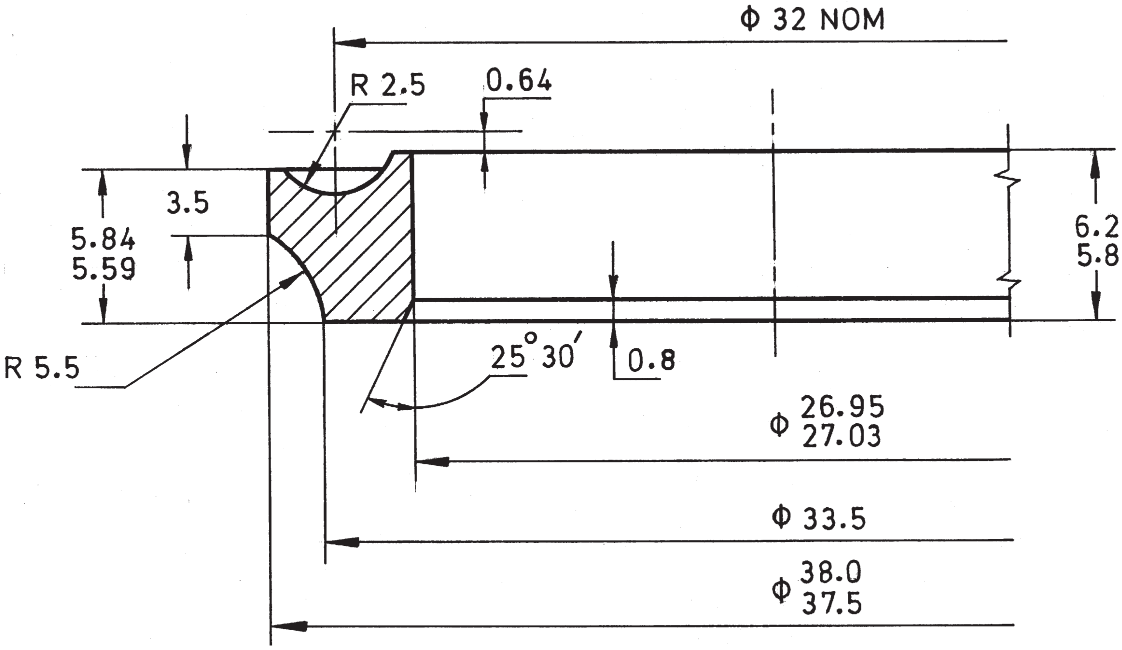
All dimensions in millimetres.

FIG. 11 TOP FRAME CUP



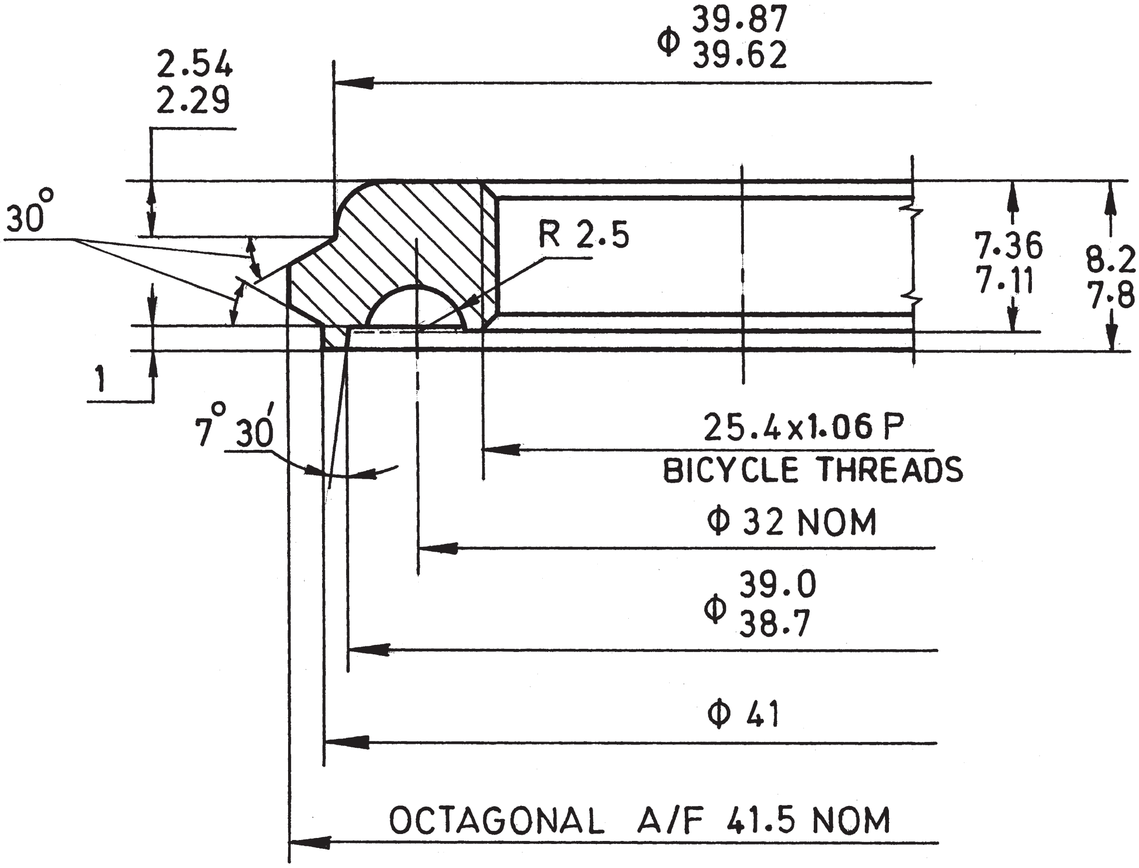
All dimensions in millimetres.

FIG. 12 BOTTOM FRAME CUP



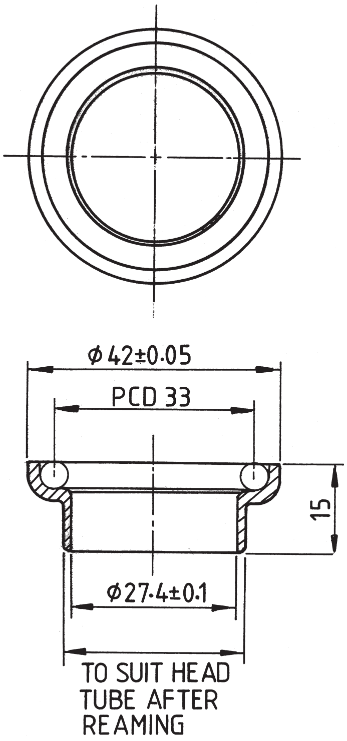
All dimensions in millimetres.

FIG. 13 CROWN BALL RACE

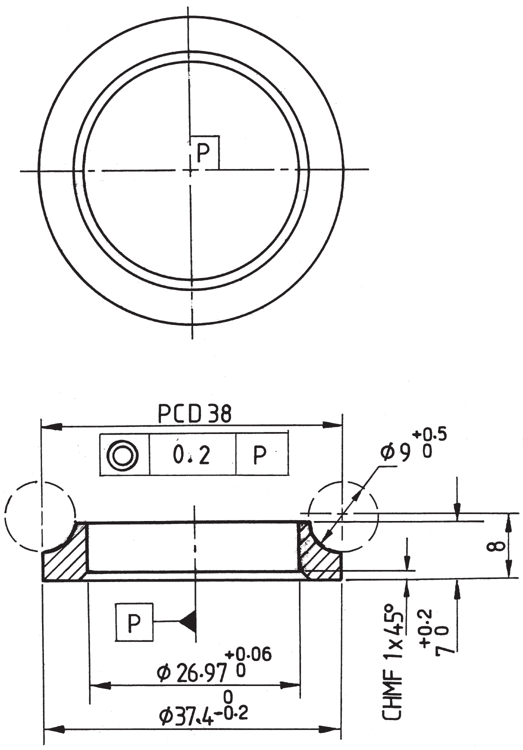


All dimensions in millimetres.

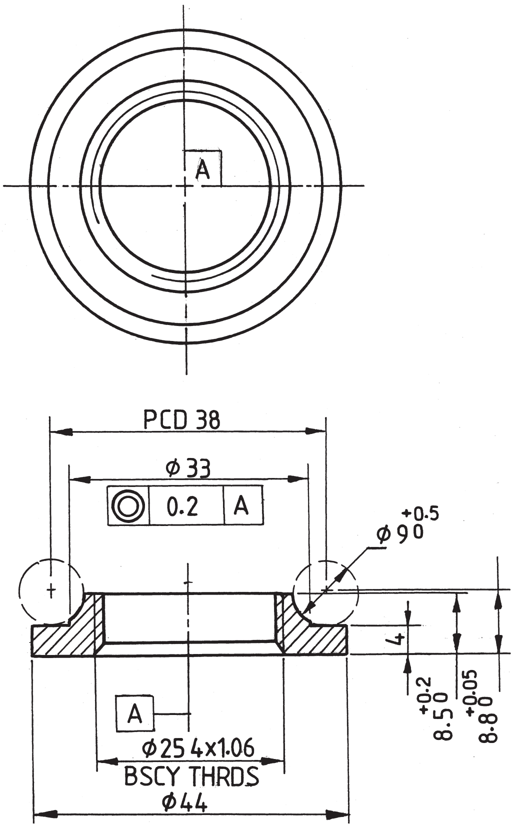
FIG. 14 SCREW RACE



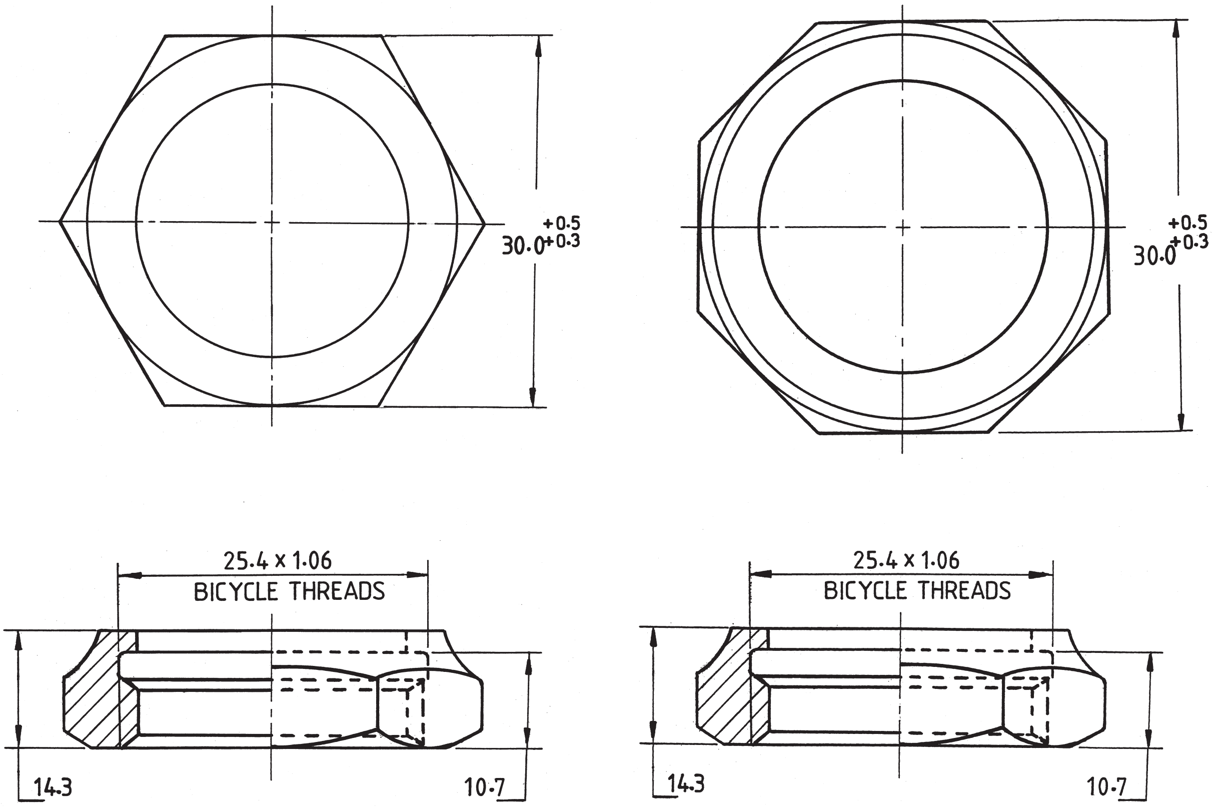
All dimensions in millimetres.
FIG. 15 FRAME CUP (TOP AND BOTTOM)



All dimensions in millimetres.
FIG. 16 CROWN RACE



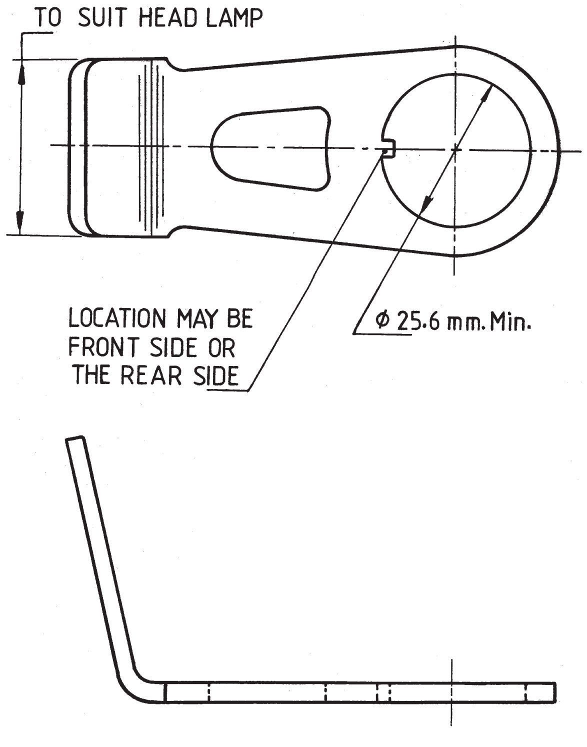
All dimensions in millimetres.
FIG. 17 SCREW RACE



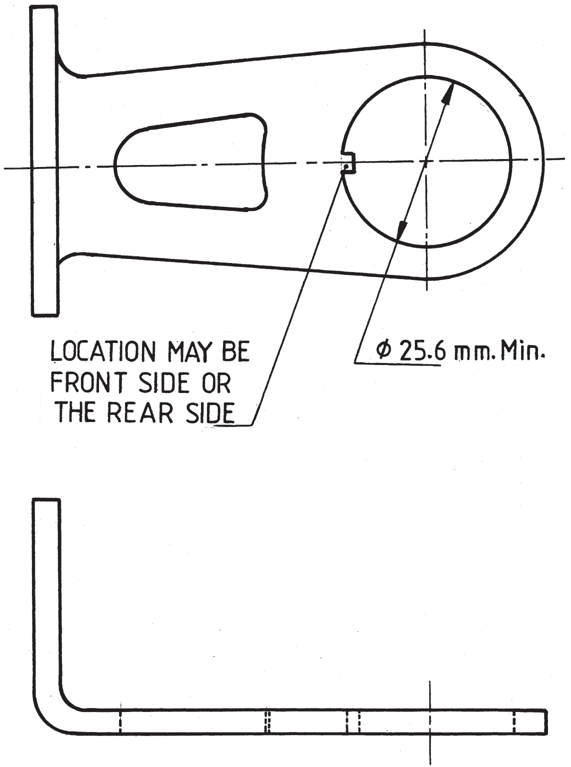
All dimensions in millimetres.
18A Locking Nut (Hexagonal Shape)

All dimensions in millimetres.
18B Locking Nut (Octagonal Shape)

FIG. 18 TYPES OF LOCKING NUTS



All dimensions in millimetres.
FIG. 19 A LAMP BRACKET (SCHEMATIC)



All dimensions in millimetres.
FIG. 19B BASKET MOUNTING BRACKET (SCHEMATIC)

and Fig. 19B.

6 FINISH

6.1 Frame Cups

The top and bottom ball race seating shall be nickel-chrome plated to Service Condition No. 1 (Classification No. SNi 10b Crr) of IS 1068. Alternatively 'Frame Cups' that do not form composite unit with their ball races like PH-type may be black powder coated and the thickness of coating shall be kept not less than 40 microns without affecting the functional requirement.

6.2 Inner Ball Races and Crown Races

The top and bottom inner races shall be provided with protective self finish. The crown races shall be either chemically coloured or zinc plated to Service Condition No. 2 (Classification No. FeZn12) of IS 1573 or nickel chrome plated for Service Condition No. 1 (Classification No. SNi 10b Crr) of IS 1068.

6.3 Screwed Race

The screwed race shall be nickel-chrome plated to Service Condition No. 1 (Classifi-cation No. SNi 10bCrr) of IS 1068 or zinc plated to Service Condition No. 2 (Classification No. FeZnl2) of IS 1573 or cadmium plated to Service Condition No. 2 (Classification No. Cd8) of IS 1572.

6.4 Locking Nut

The locking nut shall be nickel-chrome plated to Service Condition No. 1 (Classifi-cation No. SNi 10bCrr) of IS 1068 or cadmium plated to Service Condition No. 2 (Classifi-cation No. Cd8) of IS 1572 or zinc plated to Service Condition No. 2 (Classification No. FeZn12) of IS : 1573.

6.5 Lamp Bracket / Basket Bracket / Spacer Washer

These shall be nickel and chromium plated and the electroplated coating shall conform to Service Grade No. 1 with designation SNi 10b Crr of IS 1068 with the provision that *p*- or *d*-nickel and *f*-chromium may be substituted for b-nickel and r-chromium respectively. Alternatively these shall be black powder coated and the thickness of coating shall be kept not less than 40 microns.

7 TESTS

7.1 The steering head assembly shall rotate freely after assembly (*see also* IS 10613).

7.2 Lamp Bracket

Lamp brackets shall be subjected to load test. Typical arrangements for the load test have been illustrated in Fig. 20. Test load of 15 kgf shall be applied for 1 min. The permissible deflection, at the end of test shall not exceed 2 mm.

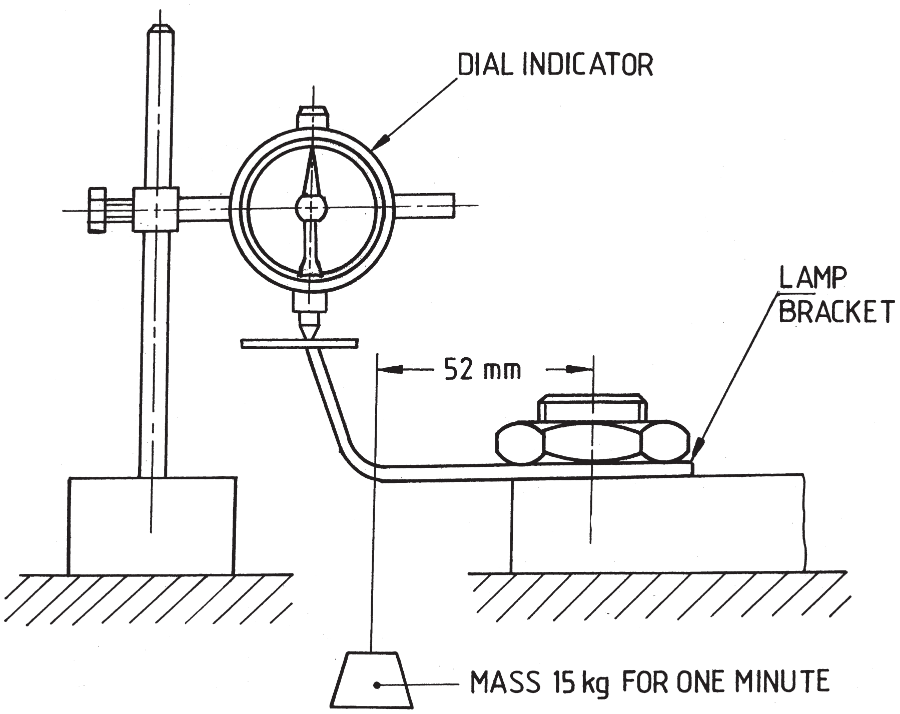


FIG. 20 ARRANGEMENT FOR LOAD TEST OF LAMP BRACKET

8 MARKING

Manufacturer's name, initials or trade-mark and country of origin, etc to be marked on the packing.

8.1 BIS Certification Marking

The steering head assembly may also be marked with the Standard Mark.

8.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The detail of conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from Bureau of Indian Standards.

9 PACKING

Packing shall be in accordance with the best prevalent trade practices.

10 SAMPLING

10.1 Unless otherwise agreed to between the supplier and the purchaser, the procedure given in IS 2500 (Part 1) shall be followed for sampling inspection.

10.1.1 For dimensions, finish and workmanship, inspection level IV and acceptable quality level (AQL) 2.5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) shall be followed.

10.1.2 For tests, inspection level I and acceptable quality level (AQL) 2.5 percent as given in Tables 1 and 2 of IS 2500 (Part 1) shall be followed.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Bicycles Sectional Committee, TED 16

Organization	*Representative(s)*
Bicycle and Sewing Machines (R&D Centre), Ludhiana	Shri Paramjeet Singh (***Chairman***) Shri R. S. Bains (*Alternate*)
All India Bicycle Manufacturers Association, New Delhi	Ms Kanchan Zutushi Shri B. S. Dhiman (*Alternate*)
Atlas Cycles (Haryana) Limited, Sonepat	Shri Vikram Kapur Shri Girish Kapur (*Alternate*)
Avon Cycles Ltd, Ludhiana	Shri Onkar Singh Pahwa SHRI B. S. DHIMAN (*Alternate*)
Bhogal Sons (Regd), Ludhiana	Shri Naginder Singh Bhogal Shri R. S. Bhogal (*Alternate*)
Controllerate of Quality Assurance (Vehicles), Ahmednagar	Shri P. V. Harkare Shri B. G. Shinde (*Alternate*)
Department of Industrial Policy and Promotion, New Delhi	Shri K. K. Sinha Shri M. Z. Khan (*Alternate*)
Director of Industries, Ludhiana	General Manager (BSMC) Senior Technical Officer (QMC) (*Alternate*)
Directorate General of Supplies and Disposals, New Delhi	Shri R. K. Aggarwal Shri W. M. Wanjari (*Alternate*)
Directorate of Industries, Govt of Haryana, Chandigarh	Shri R. N. Goyal Shri Sunil Chopra (*Alternate*)
Govind Rubber Ltd, Dist Ludhiana	Shri Vinod Poddar Shri S. P. Sukhrani (*Alternate*)
Hamilton Industries Pvt Ltd, Ambarnath	Shri Ravi Haldiya Shri P. R. Ravikumar (*Alternate*)
Hartex Rubber Ltd, Hyderabad	Shri T. R. Kukreja
Hero Cycles Ltd, Ludhiana	Shri S. K. Rai Shri K. C. Sharva (*Alternate*)
J.K. Cycles, Ludhiana	Shri Joginder Kumar
Kular Cycle Industries, Ludhiana	Shri Ajit Singh Shri Darshan Singh (*Alternate*)
Metro Tyres Limited, Ludhiana	Shri L. K. Mathur Shri Sanjeev Sood (*Alternate*)
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Nova Bicycle Industries, Ludhiana	Shri Harminder Singh Pahwa Shri Rohit Pahwa (*Alternate*)
Office of the Development Commissioner (SSI), New Delhi	Shri R. L. Garg Shri M. B. Jaya Kumar (*Alternate*)
Ralson (India) Limited, Ludhiana	Shri Sanjeev Pahwa
T.I. Cycles of India, Chennai	Shri S. Sadish Kumar Shri V. Durairaj (*Alternate*)
United Cycle and Parts Manufacturers Association, Ludhiana	President General Secretary (*Alternate*)
BIS Directorate General	Shri T. V. Singh, Scientist 'F' and Head (TED) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri P. S. Mujral
Scientist 'F' (TED), BIS

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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